

Probing cluster environments of blazars through $\gamma\gamma$ absorption

Iurii Sushch*

Centre for Space Research, North-West University, Potchefstroom 2520, South Africa

Astronomical Observatory of Ivan Franko National University of L'viv, vul. Kyryla i Methodia, 8, L'viv 79005, Ukraine

E-mail: iurii.sushch@nwu.ac.za

Markus Böttcher†

Centre for Space Research, North-West University, Potchefstroom 2520, South Africa

Blazars, a class of radio-loud active galactic nuclei with their jets pointed close to the line of sight to Earth, are the most abundant extragalactic gamma-ray sources detected both by the Fermi Gamma-Ray Space Telescope and by groundbased atmospheric Cherenkov Telescope facilities. Most blazars are known to be hosted in giant Elliptical galaxies, but their cluster environments are poorly characterized. Very-high-energy (VHE; $E \gtrsim 100$ GeV) gamma-rays emitted in the jet may be absorbed by low-energy (IR, optical) radiation through gamma-gamma pair production, leaving a characteristic imprint of the surrounding radiation field in the high-energy and VHE gamma-ray spectrum of the blazar. We study the possibility of the efficient absorption of the VHE gamma-rays in the cluster environments of gamma-ray bright blazars due to the intracluster light and/or close companion galaxies. We show that such absorption is negligible and should not affect the gamma-ray emission.

The 34th International Cosmic Ray Conference,

30 July- 6 August, 2015

The Hague, The Netherlands

*Speaker.

†The work of M.B. is supported by the South African Research Chair Initiative (SARChI) of the South African National Research Foundation and the Department of Science and Technology. Disclaimer: Any opinion, finding and conclusion or recommendation expressed in this material is that of the authors and the NRF does not accept any liability in this regard.

The conference contribution is based on the publication (1).

References

- [1] I. Sushch, and M. Böttcher, *Probing cluster environments of blazars through $\gamma\gamma$ absorption*, *A&A*, , **573** (Jan., 2015), A47, [[arXiv:1410.8810](https://arxiv.org/abs/1410.8810)].